

AMENDMENT(S) TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in this application:

Listing of Claims:

1. (Previously presented) A process for the synthesis of a mesoporous aluminum oxide composition, comprising:
 - dissolving at least one organic aluminum source in a first solvent to form a mixture;
 - adding at least one pore-forming agent to the mixture and agitating the mixture for a period of time after the addition of the pore forming agent;
 - adding a second solvent to the mixture after adding the at least one pore forming agent and subsequent agitation, wherein said second solvent contains water and at least one alkanol;
 - drying the mixture at a temperature ranging from about 40°C to about 140°C for a period of time ranging from about 2 to about 48 hours to obtain a dried gel; and,
 - removing the pore-forming agent from the dried gel.
2. (Original) The process of claim 1 wherein the aluminum source comprises aluminum alkoxides or aluminum organic salts.
3. (Original) The process of claim 1 wherein the solvent is selected from the group consisting of water, alcohols, ethers, esters, ketones and mixtures of one or more thereof.

4. (Original) The process of claim 1 wherein said pore-forming agent comprises an organic compound having a boiling point higher than 180°C.
5. (Original) The process of claim 4 wherein the said pore-forming agent comprises an organic compound having at least one heteroatom selected from N, O and S.
6. (Original) The process of claim 5 wherein the said pore-forming agent is selected from the group consisting of tetraethylene glycol, triethanolamine, triisopropanolamine, triethylene glycol, diethylene glycol, sulfolane, and diethylglycoldibenzonate.
7. (Original) The process of claim 1 wherein a molar ratio of the pore-forming agent to aluminum in the aluminum source is from about 0.1 to about 2.0.
8. (Original) The process of claim 1 wherein the at least one organic aluminum source is mixed with a framework substituted element selected from the group consisting of Si, Ga, B, P, S, La, Ce, Ti, Fe, Ni, Mo, Co, Cr, Mg, Zn, Sn, V, W, Ru, Pt, Pd, In, Mn and Cu.
9. (Previously presented) The process of claim 1 further comprising ageing the mixture at a temperature ranging from about 10°C to about 90°C for a period of time ranging up to about 48 hours prior to drying the mixture.

10. (Previously presented) A process for the synthesis of a mesoporous aluminum oxide composition, comprising:

dissolving at least one organic aluminum source in at least one solvent to form a mixture;

adding at least one pore-forming agent to the mixture;

adding a solvent to the mixture;

drying the mixture at a temperature ranging from about 40°C to about 140°C for a period of time ranging from about 2 to about 48 hours to obtain a dried gel; and,

removing the pore-forming agent from the dried gel,

further comprising heating the dried gel in an autoclave at a temperature ranging from about 80°C to about 200°C for a period of time ranging up to about 96 hours subsequent to drying the mixture.

11. (Currently amended) A process for the synthesis of a mesoporous aluminum oxide composition, comprising:

dissolving at least one inorganic source of aluminum ~~source~~ oxide in a solvent to obtain a mixture;

adding at least one non-surfactant pore-forming agent to the mixture, said pore-forming agent being capable of hydrogen bonding without forming miscelles;

adding at least one alkali to the mixture;

drying the mixture at a temperature ranging from about 40°C to about 140°C for a period of time ranging from about 1 to about 48 hours to obtain a dried gel; and,

removing the pore-forming agent from the dried gel to obtain a powder.

12. (Currently amended) The process of claim 11 wherein the at least one inorganic source of aluminum source oxide is selected from the group consisting of aluminum nitrate, aluminum chloride, aluminum sulfate[[,]] and aluminum perchlorate ~~and aluminum acetate~~.

13. (Original) The process of claim 11 wherein the solvent is selected from the group consisting of water, alcohols, ethers, esters, ketones and mixtures of one or more thereof.

14. (Original) The process of claim 11 wherein said pore-forming agent comprises an organic compound having a boiling point higher than 180°C.

15. (Original) The process of claim 14 wherein the said pore-forming agent comprises an organic compound having at least one heteroatom selected from N, O and S.

16. (Currently amended) A process for the synthesis of a mesoporous aluminum oxide composition, comprising:

dissolving at least one inorganic source of aluminum source oxide in a solvent to obtain a mixture;

adding at least one pore-forming agent to the mixture;

adding at least one alkali to the mixture;

drying the mixture at a temperature ranging from about 40°C to about 140°C for a period of time ranging from about 1 to about 48 hours to obtain a dried gel; and,
removing the pore-forming agent from the dried gel to obtain a powder,
wherein the said pore-forming agent is selected from the group consisting of tetraethylene glycol, triethanolamine, triisopropanolamine, triethylene glycol, diethylene glycol, sulfolane, and diethylglycoldibenzonate.

17. (Original) The process of claim 11 wherein a molar ratio of the pore-forming agent to aluminum in the aluminum source is from about 0.1 to about 2.0.

18. (Original) The process of claim 11 wherein the at least one alkali is selected from the group consisting of inorganic and organic alkalis.

19. (Original) The process of claim 18 wherein the inorganic alkali is selected from the group consisting of sodium hydroxide, sodium carbonate, ammonia, ammonium hydroxide and ammonium carbonate.

20. (Original) The process of claim 18 wherein the organic alkali is selected from the group consisting of tetra alkyl ammonium hydroxides, tetra alkyl ammonium halides, tetra alkyl ammonium nitrates, unsubstituted urea and substituted ureas.

21. (Original) The process of claim 11 wherein the at least one inorganic aluminum source is mixed with a framework substituted element selected from the group consisting of Si, Ga, B, P, S, La, Ce, Ti, Fe, Ni, Mo, Co, Cr, Mg, Zn, Sn, V, W and Cu.

22. (Original) The process of claim 11 further comprising ageing the mixture at a temperature ranging from about 10°C to about 80°C for a period of time ranging up to about 96 hours prior to drying the mixture.

23. (Currently amended) A process for the synthesis of a mesoporous aluminum oxide composition, comprising:

dissolving at least one inorganic source of aluminum ~~source~~ oxide in a solvent to obtain a mixture

adding at least one pore-forming agent to the mixture;

adding at least one alkali to the mixture;

drying the mixture at a temperature ranging from about 40°C to about 140°C for a period of time ranging from about 1 to about 48 hours to obtain a dried gel; and,

removing the pore-forming agent from the dried gel to obtain a powder,

further comprising heating the dried gel in an autoclave at a temperature ranging from about 80°C to about 200°C for a period of time ranging up to about 96 hours subsequent to drying the mixture.

24. (Original) The process of claim 11 further comprising washing the powder with water to remove salts generated during the preparation subsequent to removing pore-forming agent.

25. (Previously presented) The process of claim 24 further comprising drying the powder after washing with water to remove salts.

26. (Currently amended) A process for adjusting mesopore sizes in mesoporous aluminum oxides, comprising:

preparing a mixture comprising at least one aluminum species derived from a water soluble inorganic aluminum salt and at least one pore-forming agent;

drying the mixture at a temperature ranging from about 40°C to about 140°C for a period of time ranging from about 1 to about 48 hours to obtain a dried gel;

heating the dried gel in an autoclave at a temperature ranging from about 80°C to about 200°C for a period of time ranging from about 1 to about 120 hours; and,

removing the pore-forming agent.

27. (Original) The process of claim 26 wherein said pore-forming agent comprises an organic compound having a boiling point higher than 180°C.

28. (Original) The process of claim 27 wherein the said pore-forming agent comprises an organic compound having at least one heteroatom selected from N, O and S.

29. (Original) The process of claim 28 wherein the said pore-forming agent is selected from the group consisting of tetraethylene glycol, triethanolamine, triisopropanolamine, triethylene glycol, diethylene glycol, sulfolane, and diethylglycoldibenzonate.

30. Canceled.

31. Canceled.

32. Canceled.

33. Canceled.

34. Canceled.

35. Canceled.

36. Canceled.

Claim 37, cancel without prejudice.

38. Canceled.

Claims 39 - 47, (Canceled)

48. (Previously presented) The process of claim 1 wherein the first solvent comprises at least one non-aqueous alcohol.

49. (Previously presented) The process of claim 48 wherein the first solvent comprises a mixture of isopropanol and ethanol.

50. (Previously presented) The process of claim 1 wherein the second solvent comprises water, isopropanol and ethanol.

51. (Previously presented) A process for the synthesis of a mesoporous aluminum oxide composition, comprising:

dissolving at least one inorganic aluminum source in a solvent to obtain a mixture;

adding at least one pore-forming agent to the mixture;

adding at least one basic alkali metal compound to the mixture;

drying the mixture at a temperature ranging from about 40°C to about 140°C for a period of time ranging from about 1 to about 48 hours to obtain a dried gel; and,
removing the pore-forming agent from the dried gel to obtain a powder.

52. (Previously presented) The process of claim 51 wherein the basic alkali metal compound is NaOH.

53. (New) The process of claim 11 wherein the step of adding the at least one alkali is performed after the step of adding the at least one non-surfactant pore forming agent.

54. (New) The process of claim 16 wherein the step of adding the at least one alkali is performed after the step of adding the at least one pore forming agent.

55. (New) The process of claim 23 wherein the step of adding the at least one alkali is performed after the step of adding the at least one pore forming agent.

56. (New) The process of claim 26 wherein the water soluble inorganic aluminum salt is selected from the group consisting of aluminum nitrate, aluminum chloride, aluminum sulfate and aluminum perchlorate.